TITLE OF THE INVENTION

An internal structural lintel is for supporting unit masonry above an opening in a wall.

CROSS REFERENCE TO RELATED APPLICATIONS

Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

Not Applicable

INCORPORATION BY REFERENCE OF MATERIAL SUBMITTED ON A

COMPACT DISC

Not Applicable

BACKGROUND OF THE INVENTION

(1) Field of Invention

This invention relates to building construction, specifically to a support for masonry units over a wall opening.

(2) Description of Related Art

An opening in a masonry wall can be affected by forming a natural arch, whereby gravity forces on the masonry are directed to the ends of the arch through compression of the masonry units and the mortar. A semi-circular arch is a very efficient shape for transferring the vertical forces to the ends of the opening. It may be desired to achieve an aesthetic different from a semi-circular head. It is possible to construct an arch with a

dimension from the spring line to the apex less than half its width; however, the lower the ratio of these dimensions, the greater the amount of side thrust exerted by the arch. The magnitude of the thrust can become prohibitively large, especially if the thrust is directed against a column or pier of limited width. Another condition of concern is a wide jamb (deep pocket in a wall). In this case, much of the arch bears on, and thrusts against a veneer of masonry whose plane is perpendicular to the thrust force, and therefore cannot offer substantial resistance.

Systems that utilize steel allow much more freedom of design. Gravity forces can be transferred to major structural elements of the building (e.g. beams and columns) using steel rods and shapes attached with mechanical or welded connections to the structural elements. The masonry units rest on a steel shelf that is attached to the steel rod or shape. A steel angle is a very common shelf for masonry that can be connected to beams, anchored to concrete floor slab, or merely rested on masonry jambs at each side of the opening. William T. Welch, in Patent No 4,020,612, has offered an improvement of this method. But in this invention, the elongated plate 14 remains exposed at the head of the window (or door) opening. It is frequently aesthetically undesirable to have steel elements exposed to view. There is also the issue of protection from the elements and continued maintenance of that protection. Most typically, this protection is in the form of paint, which must be reapplied every few years. While further limited to constructions with hollow block masonry, the inventions of John A. Powers (Patent No. 4,757,656), Bengston et al. (Patent No. 5,138,808), Greenberg et al. (Patent Application No. 2005/0086881) and of Parrino et al. (Patent Application No. 2006/0179738) also have

steel elements exposed at the head of the opening. None of these inventions is completely hidden from view and from the elements by the masonry.

Other inventions consist of internal structural members fully contained within the wall and having some form of hanger element that relies on the mortar in some way to help carry the bricks. Examples of this can be seen in the inventions of Norman McIvor (Patent No. 1412477), John Klaber (Patent No. 2325614), Donald Drayer (Patent No. 2361828), and of Kelly et al. (Patent No. 6,854,219). All the listed examples of internal lintels place their strength elements within the joints between courses of masonry, either oriented horizontally or vertically. This limits the bond pattern achievable with the lintel. This also places a practical limit on the strength of the main element and a corresponding limit on the width of an opening. The previously listed lintels have minimal strength perpendicular to the major plane of the beam.

Another means of supporting brick masonry over an opening is resting it on reinforced concrete that has been prepared to either complement the masonry or mimic it with coloring and surfacing. Reinforced concrete lintels are heavy in comparison with other common methods. This can be a significant disadvantage during construction, because a crane is required for a trade that normally would not need one. Excessive weight can also exceed structural limits of bearing pressure on the masonry at the jambs of the opening, where this type of lintel is usually supported. Finally, this method (like others) can be limiting for a designer. This invention is much lighter and typically can be set without a crane. The lower weight also reduces pressure at the bearings. The visible product is masonry installed by a craftsman, rather than a facsimile.

BRIEF SUMMARY OF THE INVENTION

A new and useful lintel structure is disclosed as being fabricated of a support beam contained completely within the wall cavity. Attached to the support beam, along its entire length, is a connection strut channel oriented so that the open slot is facing away from the support beam. A perforated suspension member is attached to the side of a masonry unit using threaded masonry anchors that are received into properly sized holes drilled into the face of the masonry unit. The suspension member is attached to the strut channel using a tee-headed strut fastener and nut. Upon completion, none of the elements of the invention are visible, being concealed by masonry work.

DRAWINGS

Brief Description of Drawings

Figure 1 is an isometric view of the lintel with some brick removed for clarity. Figure 2 is an elevation view of an opening in a brick wall. Figure 3 is a section view taken through Figure 2.

Reference numerals in the figures represent the following:

1. masonry unit
2. threaded masonry anchor
3. perforated suspension member
4. attachment angle
5. connection strut channel
6. support beam
7. bearing jamb (cripple stud)
8. strut fastener

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 is an isometric view of masonry veneer suspended over a window or door opening, using the invention. The suspension member 3 is attached to an attachment angle 4 by means of either a welded or a mechanical connection. This connection is made in the shop to form an assembly. A masonry unit 1 is drilled to receive a threaded masonry anchor 2. The perforated suspension member 3 is attached to the side of a masonry unit 1 with a threaded masonry anchor 2, extending through a perforation hole in the suspension member 3, and thence into the drilled hole in the masonry unit 1. The many perforations in the suspension member 3 allow adjustment of the location of the masonry unit 1 in two orthogonal directions within the plane of the member. Adjustment

may be necessary, as many bricks are manufactured with core holes that limit suitable locations for the threaded anchor. Another assembly is made in the shop by continuously connecting a connection strut channel 5 to the bottom face of the support beam 6. A tee-headed strut fastener 8 manufactured for use with the strut channel is inserted head first into the slot of the channel and rotated 90 degrees so that the ears of the head bear upon the lips of the channel on each side of the slot. The attachment angle 4 is fastened to the strut fastener 8 with a threaded nut. This connection is made in the field by the mason building the wall. Figure 3 is a cross-section of the invention that clearly shows the relationship of the aforementioned elements. Each suspension member 3 can be located anywhere along the support beam 6, allowing adjustment in the third dimension that is normal to the plane of the perforated suspension member. The support beam bears at both ends on a bearing jamb 7.

Figure 2 shows an elevation view of the assembled lintel. The dimensions of the perforated suspension member 3 are such that the edges will stop short of the visible face of the masonry wall. The joints between masonry units are then tuck-pointed with mortar to match the appearance of surrounding masonry wall. All steel elements of the invention are then hidden from view.